AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application.

1. (Currently amended) A method for measuring parameters which describe a particle size distribution of particles in a liquid, which method comprises the steps of:

performing a series of particle reflection measurements, in each of which a signal beam is generated in the liquid and a measured value (A) of a property of a reflection ~~on~~of the signal beam by a particle in a path of the signal beam in the liquid is measured;

performing a maximum likelihood estimation of the parameters in view of a combination of the measured values (A), based on an expression for a probability of the measured values as a function of the measured values, which expression contains a first factor (P) for a probability of a particle reflection measurement of which a reflection with the measured value forms a part, corrected with a second factor (Q) for a probability that there is not also a particle reflection in the liquid with a dominating value of the property, which would mask the measured value, forming part of the particle reflection measurement.

2. (Currently amended) A method according to claim 1, wherein the first factor (P) comprises the particle size distribution, smeared with a probability distribution that a particle in the liquid of a particular size leads to a particle reflection measurement of which a particle reflection with the measured value forms a part.

3. (Currently amended) A method according to claim 1, wherein the second factor (Q) comprises a probability that a particle reflection in the liquid with a value other than the measured value forms part of a particle reflection measurement, integrated over a range of values other than the measured values.

4. (Currently amended) A method according to claim 3, wherein the second factor substantially corresponds to $\exp(- C \int dA' \int dD\, f_D(D)\, G(A' | D))$, wherein D is a particle size, C is a concentration of the particles, $f_D(D)$ is a density of particles of particle size D, and $G(A|D)$ is a conditional probability that a reflection by a particle in the liquid with amplitude A is detectable, if a particle of a size D yields a detectable reflection.

5. (Previously presented) A method according to claim 1, wherein the maximum likelihood estimation step comprises performing counts of numbers of reflection, measurements in which the measured values fall into respective value intervals, and an estimate is chosen such that a complex of deviations between counts in the different intervals and counts predicted according to a probability as a function of the measured values is minimized.

6. (Currently amended) A method according to claim 1, wherein in the particle reflection measurements a distinction is made between different types of particles in the liquid that cause reflections, and in performing the maximum likelihood estimation step the expression is corrected with a product of respective second factors for the probability that there is not also a particle reflection in the liquid with a dominating value of the property by respective types of particles, which would mask the measured value, forming part of the particle reflection measurement.

7. (Currently amended) An apparatus for measuring parameters which describe a particle size distribution of particles in a liquid, which apparatus comprises:

a liquid channel;

an ultrasonic transducer assembly for generating an ultrasonic beam in the liquid channel containing the liquid;

a detector for measuring a property of a reflection of the beam ~~on~~by a particle in the liquid in the liquid channel to provide a signal corresponding to a measured value;

a processing unit arranged for performing a maximum likelihood estimation of the parameters, in view of a combination of a series of the measured values, based on an expression for a probability of the measured values as a function of the measured values, which expression contains a first factor for a probability of a particle reflection measurement of which a particle reflection with the measured value forms part, corrected with a second factor for a probability that there is not also a reflection by a particle in the liquid with a dominating value of the property, which would mask the measured value, forming part of the particle reflection measurement.

8. (Currently amended) A computer program product with instructions for measuring parameters which describe a particle size distribution of particles in a liquid, based on a series of particle reflection measurements, in each of which a signal beam is generated in the liquid and a measured value (A) of a property of a reflection ~~on~~by a particle in a path of the signal beam in the liquid is measured; and wherein the instructions are arranged for performing the steps of:

generating a maximum likelihood estimation of the parameters in view of a combination of the measured values (A), on the basis of an expression for a probability of the measured values as a function of the measured values, which expression contains a first factor (P) for a probability of a particle reflection measurement of which a particle reflection with the measured value forms a part, corrected with a second factor (Q) for a probability that there is not also a particle reflection with a dominating value of the property, which would mask the measured value, forming part of the particle reflection measurement.

9. (Currently amended) A method according to claim 2, wherein the second factor (Q) comprises a probability that a particle reflection with a value other than the measured value forms part of a particle reflection measurement, integrated over a range of values other than the measured values.

10. (Currently amended) A method according to claim 9, wherein the second factor substantially corresponds to $\exp(- C \int dA' \int dD\, f_D(D)\, G(A' | D))$, wherein D is a particle size, C is a concentration of the particles, $f_D(D)$ is a density of particles of particle size D, and $G(A|D)$ is a conditional probability that a reflection by a particle in the liquid with amplitude A is detectable, if a particle of a size D yields a detectable reflection.